भारतीय मानक
Indian Standard

IS 13630 (Part 5) : 2019

सिरैमिक टाइलें — परिक्षण पद्धतियां, नमूने लेने तथा स्वीकार्यता का आधार

भाग 5 तापीय प्रघात की प्रतिरोधिता ज्ञात करना

(दूसरा पुनरीक्षण)

Ceramic Tiles — Methods of Test, Sampling and Basis for Acceptance

Part 5 Determination of Resistance to Thermal Shock

(Second Revision)

ICS 91.100.23

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भारतीय मानक ब्यूरो
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Flooring, Wall Finishing and Roofing Sectional Committee, CED 05

FOREWORD

This Indian Standard (Part 5) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Flooring, Wall Finishing and Roofing Sectional Committee had been approved by the Civil Engineering Division Council.

This standard (Part 5) was first published in 1992 and subsequently revised in 2006. This second revision incorporates the experience gained with the use of this standard and brings the standard in line with the latest developments in this field.

The following are the significant modifications incorporated in this revision:

a) Temperature cycling time has been modified.

This Indian Standard is published in several parts. The other parts in this series are:

Part 1	Determination of dimensions and surface quality
Part 2	Determination of water absorption and bulk density
Part 3	Determination of moisture expansion using boiling water
Part 4	Determination of linear thermal expansion
Part 6	Determination of modulus of rupture and breaking strength
Part 7	Determination of stain and chemical resistance of unglazed tiles
Part 8	Determination of stain and chemical resistance of glazed tiles
Part 9	Determination of crazing resistance of glazed tiles
Part 10	Determination of frost resistance
Part 11	Determination of resistance to surface abrasion of glazed tiles
Part 12	Determination of resistance to deep abrasion of unglazed tiles
Part 13	Determination of scratch hardness of surface according to Mohs' scale
Part 14	Determination of impact resistance by measurement of coefficient of restitution
Part 15	Sampling and basis for acceptance
Part 16	Determinations of lead and cadmium given off by glazed tiles

In the formulation of this standard considerable assistance has been derived from the ISO 10545-9 : 2013 'Ceramic tiles — Part 9: Determination of resistance to thermal shock'.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

CERAMIC TILES — METHODS OF TEST, SAMPLING AND BASIS FOR ACCEPTANCE

PART 5 DETERMINATION OF RESISTANCE TO THERMAL SHOCK

(Second Revision)

1 SCOPE

This standard (Part 5) covers a method of test for determining the resistance to thermal shock of all ceramic tiles in normal conditions of use.

Depending on the water absorption of the tiles, different procedures (tests with or without immersion) are used unless there is an agreement to the contrary.

2 PRINCIPLE

Determination of resistance to thermal shock of a whole tile by cycling 10 times between the temperature of cold water and a temperature just above that of boiling water. Usually tests are carried out between 15 °C and 145 °C.

3 APPARATUS

3.1 Low Temperature Bath — Through which cold water flows at 15 ± 5°C. One example is a bath 550 mm long, 350 mm wide and 200 mm deep with water flow rate of 4 litre/min. Any other suitable apparatus may be used.

3.1.1 *Testing With Immersion* — In the case of all tiles having water absorption not greater than 10 percent the bath is not covered and is of sufficient depth to allow the tiles to be placed vertically and immersed completely.

3.1.2 *Testing Without Immersion* — In the case of glazed tiles having water absorption greater than 10 percent, the bath is covered with a 5 mm thick aluminium plate in such manner that the water, directed towards the surface is in contact with the plate. Covering the aluminium plate is a layer of aluminium grains approximately 5 mm thick with diameters in the range of 0.3 mm to 0.6 mm.

3.2 Oven — Capable of operation at 145 °C to 150 °C.

4 TEST SPECIMENS

A minimum of five test specimens shall be used.

5 PROCEDURE

5.1 First examine the tiles for visible defects by viewing them with the naked eye (with the aid of spectacles if usually worn) from a distance of 25 cm to 30 cm under an illumination of approximately 300 lux. All the test specimens shall be free from defects at the commencement of test. The methylene blue solution described in **5.5** may be used to detect pretest defects.

5.2 For Testing With Immersion

In the case of low porosity tiles having water absorption not greater than 10 percent, immerse them vertically in cold water at 15 ± 5°C so that they are not in contact with each other.

5.3 For Testing Without Immersion

In the case of glazed tiles having water absorption greater than 10 percent, place the glazed surface downwards in contact with the aluminium grains over the cold water bath at 15 ± 5°C.

5.4 Temperature Cycling

For both procedures, after 15 min at the low temperature, immediately transfer the test specimens to the oven and keep it at 145°C to 150°C until a uniform temperature is achieved (usually 20 min), and then immediately transfer them back to the low temperature conditions.

Repeat this procedure 10 times.

5.5 Examination

Then examine the test specimens for visible defects by viewing them with the naked eye (with the aid of spectacles if usually worn) from a distance of 25 cm to 30 cm under an illumination of approximately 300 lux. To assist in detecting defects, a suitable stain (such as 1 percent aqueous solution of methylene blue containing a small quantity of wetting agent) may be brushed onto the glazed surfaces of the test specimens. After 1 min, wipe off the stain with a damp cloth.

6 TEST REPORT

The test report shall contain the following:

a) Description of the tiles;
b) Water absorption coefficient of the tiles;
c) Type of test performed (with or without immersion); and
d) Number of test specimens with visible defects.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Flooring, Wall Finishing and Roofing Sectional Committee, CED 05

Organization	*Representative(s)*
In Personal Capacity (*L/109, Sarita Vihar, New Delhi*)	Shri Ashok Khurana (***Chairman***)
Ardex Endura India Pvt Ltd, Bengaluru	Shri K. P. Paulson Shri Gopinath Krishnan (*Alternate*)
Building Materials & Technology Promotion Council, New Delhi	Shri S. K. Gupta Shri Pankaj Gupta (*Alternate*)
Carborundum Universal Limited, Chennai	Shri R. Rajagopalan Dr N. Ramasubramanian (*Alternate*)
Central Public Works Department, New Delhi	Shri Rajesh Kumar Kaushal Shri Arun Kumar Tyagi (*Alternate*)
CSIR − Central Building Research Institute, Roorkee	Shri S. K. Singh Shri Achal Kumar Mittal (*Alternate*)
CSIR − Central Glass & Ceramic Research Institute, Kolkata	Dr Satyendra Nath Misra
CSIR − Central Road Research Institute, New Delhi	Dr Rakesh Kumar
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Construction Chemicals Manufacturers Association, Navi Mumbai	Shri Upen Patel Shri Samir Surlaker (*Alternate*)
Construction Industry Development Council, New Delhi	Shri P. R. Swarup Shri Ravi Jain (*Alternate*)
Delhi Development Authority, New Delhi	Chief Engineer (Dwk) Superintending Engineer (P) (*Alternate*)
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H. R. Johnson (India) Limited, Dewas	Shri Arun Rao
Indian Council of Ceramic Tiles & Sanitaryware, New Delhi	Shri Arun Rao Shri P. K. Sharma (*Alternate*)
Institution of Engineers (India), New Delhi	Shri K. K. Kapila
Lloyd Insulation (India) Pvt Limited, New Delhi	Shri Mohit Khanna Shri K. K. Mitra (*Alternate*)
Mapie Construction Products India Pvt Ltd, Bengaluru	Dr G. S. Ravi Shankar Shri Abhijit Dutta (*Alternate*)
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Modern Tiles & Marble, New Delhi	Shri Subhash Kapoor Shri Kameswar Rau (*Alternate*)
Morbi Dhuva Glaze Tiles Association, Morbi	Shri Nilesh Jetparia Shri Jeram Madhav Kavar (*Alternate*)
Municipal Corporation of Greater Mumbai, Mumbai	Representative

Organization	*Representative(s)*
MYK Laticrete India, Hyderabad	Dr P. Arjunan Shri N. Radhakanth (*Alternate*)
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New Delhi Municipal Corporation, New Delhi	Representative
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Amendments Issued Since Publication

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